IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

David S. DeLORENZO, et al.

Serial No.:	10/606,514	Group Art Unit:	2125
Filed:	June 25, 2003	Examiner:	S. Shechtman
FOR:	METHOD AND APPARATUS FOR MEMORY BANDWIDTH THERMAL BUDGETTING		

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant submits this appeal brief, thus perfecting the notice of appeal filed on March 7, 2005.

The required headings and subject matter follow.

(i) *Real party in interest.*

This case is assigned of record to Intel Corporation, who is the real party in interest.

(ii) *Related appeals and interferences.*

There are no known related appeals and / or interferences.

(iii) *Status of claims.*

Claims 1-36 are pending in the case. Claims 1-7, 13-19 and 25-31 stand rejected. The rejections of claims 1-7, 13-19 and 25-31 are being appealed.

P15056

(iv) *Status of amendments.*

No amendments have been made to the originally filed claims. The attached Claims appendix reflects the current status of the claims.

(v) *Summary of claimed subject matter.*

Some embodiments of the invention involve providing a device (e.g. a memory device, see paragraph 0026) having a thermal characteristic which is dependent on a number of times the device is accessed over a period of time, calculating a temperature estimate of the device (e.g. see block 33 in Fig. 3 and related description in paragraphs 0038-0039), and controlling access to the device in accordance with the calculated temperature estimate (e.g. see blocks 35 and 37 in Fig. 3 and related description in paragraphs 0038-0039).

(vi) *Grounds of rejection to be reviewed on appeal.*

I.   Claims 1-7, 13-19, and 25-31 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,470,238 (Nizar).

(vii) *Argument.*

I.   The rejection of claims 1-7, 13-19, and 25-31 under 35 U.S.C. § 102(e) as being anticipated by Nizar is in error and should be reversed.

Claims 1, 13, and 25

Claim 1, 13, and 25 each recite, among other things, features related to calculating a temperature estimate of the device <u>and</u> controlling access to the device in accordance with the calculated temperature estimate. Nizar fails to teach or suggest these claim recitations.

The final office action relies on col. 11, line 52 - col. 12, line 2 of Nizar for allegedly disclosing a controller adapted to calculate a temperature estimate of a device and to control access to the device in accordance with the calculated temperature estimate. However, this analysis is incorrect. For the Board's convenience, the cited portion is reproduced below:

> FIG. 7 is a block diagram of one embodiment of the invention implemented with a weighted counter. A chipset typically has several groups of I/O interfaces. The package and die temperatures can be predicted by summing the power dissipated by the various I/O interfaces. In the previously described embodiments, the throttling mechanism consisted of a simple counter. The counter assumed that all I/O interfaces dissipated the same amount of power per unit I/O. The counter monitored the amount of I/O traffic being driven from the chip over a period of time. When the value of the counter exceeded a programmed limit the I/O traffic was halted or other corrective action was taken. For example, a chipset that has 3 I/O interfaces; A 700, B 702, and C 704 as illustrated in the figure. Based on calculations it may be determined that when 300 MB/s of traffic is driven on interface C 704 the package and die thermal limits are reached. The throttle counter limit must therefore be set to 300 MB/s to keep the package temperature within its limit.

The final office action, for the first time in numbered paragraph 11, clarified the Examiner's position that the cited portion stating that "package and die temperatures can be predicted" is relied upon for allegedly corresponding to the recited temperature estimate. The final office action, for the first time, further clarified that the "summing" is relied upon for the recited calculation.

Applicants first note that the cited portion is completely devoid of any express mention of a calculated temperature estimate. The statement that "package and die temperatures can be predicted" does not describe any actual calculation of a temperature estimate. In context, it is clear that the statement does not refer to any actual calculation, but only to the well known use of power dissipation as a proxy for thermal management of devices.

The Examiner relies on an out of context word "summing" for the recited calculation of a temperature estimate. In context, the cited portion actually reads "summing the power dissipated". To the extent that the Examiner relies on the indicated "summing" for the recited calculation, Nizar teaches only calculating an accumulated power dissipated, which is different from and does not identically describe the recited calculated temperature estimate. In fact, the accumulated power dissipation is substantially the same as the accumulated thermal load from the previously relied upon Craft reference, which the Examiner has admitted is different from the recited calculated temperature estimate.

The Nizar reference states that "The package and die temperatures can be predicted by summing the power dissipated by the various I/O interfaces." However, nowhere in Nizar is a predicted temperature calculation ever made. The statement merely refers to the fact that the temperature of the package and die has some relationship to the sum of the power dissipation. Clearly, the predicted package / die temperature is not identical to the sum of the dissipated power. Rather, some other calculation would have to be made to arrive at a predicted temperature based on the sum. Nizar does not teach or suggest that this calculation is ever made. Nizar only teaches that by using a weighted counter the power dissipation can be kept within appropriate limits.

Because Nizar fails to identically describe calculating a temperature estimate, claims 1, 13 and 25 are each not anticipated by and are patentable over Nizar, and the rejection should be reversed. Their respective dependent claims are likewise patentable.

Nizar further fails to identically describe controlling access to the device using the 'predicted temperature.' As noted above, each of claims 1, 13, and 25 further recite, among other things, features related to controlling access to the device in accordance with the calculated temperature estimate. Even assuming, for the sake of argument, that the predicted package / die temperature mentioned in Nizar in some way corresponded to

some calculated temperature estimate, the controller described in the cited portion does not use the mentioned predicted temperature to control access to the package / die.

In contrast to the present invention as recited in claims 1, 13, and 25, Nizar discloses only the conventional system which tracks the number of accesses to a device and increments or decrements counters based on the number of accesses and a weighted count value. The cited portion of Nizar (reproduced above) merely describes the operation of an I/O counter. The cited portion mentions controlling an access rate when a certain amount of I/O traffic is reached. However, the cited portion does not teach or suggest using the predicted temperature to control access to the device. In fact, the cited portion clearly states that "[b]ased on calculations it may be determined that when 300 MB/s of traffic is driven on interface C 704 the package and die thermal limits are reached. The throttle counter limit must therefore be set to 300 MB/s to keep the package temperature within its limit." (Emphasis added). Accordingly, the controller described in Nizar controls access to the package / die based on the throttle counter limit and a determined maximum amount of traffic, and not based on any calculated temperature estimate.

Because, among other things, Nizar further fails to teach or suggest features related to controlling access to the device in accordance with the calculated temperature estimate, claims 1, 13, and 25 are not anticipated by and are patentable over Nizar, and the rejection should be reversed. Claims 2-7 depend from claim 1 and are likewise patentable. Claims 14-19 depend from claim 13 and are likewise patentable. Claims 26-31 depend from claim 25 and are likewise patentable.

Applicants note that neither the rejection of record nor the Examiner's response to applicants' arguments in the final office action actually sets forth the Examiner's position or explains how Nizar allegedly describes controlling access to the device in accordance with the 'predicted temperature.' The Examiner's response to applicants' arguments clearly addresses (albeit incorrectly) the recited calculating a temperature estimate, but

completely ignores the further recitations of controlling access to the device in accordance with the calculated temperature estimate.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

Claims 2, 14, and 26

Claims 2, 14, and 26 each recite features relating to receiving an access request, calculating the temperature estimate in accordance with the access request, determining if the temperature estimate exceeds a temperature threshold, and imposing an access request budget if the temperature estimate exceeds the temperature threshold. The final office action fails to establish anticipation of these claims.

With respect to claims 2, 14, and 26, the office action cites various portions or figures of Nizar, for allegedly disclosing these claims, without any supporting analysis or statements as to how the cited portions or figures might read on the claims. Even with reference to the cited portions, it is not apparent to applicants how the Examiner might be applying the reference against the claims.

The applicants respectfully requested a new, non-final office action in compliance with 37 C.F.R. § 1.104(c)(2), setting forth the Examiner's position with particularity as to how the cited portions of Nizar allegedly reads on each and every claim recitation of these dependent claims. Such clarification was not provided. In the absence of the Examiner setting forth sufficient analysis to establish anticipation, claims 2, 14, and 26 are not anticipated by and are separately patentable over Nizar, and the rejection should be reversed.

Without a clearly articulated basis of the rejection, which clearly explains the pertinence of the cited portion and properly communicates the basis for the rejection, applicants have been deprived of a fair opportunity to reply. In any event, the Examiner has the burden in the first instance to establish anticipation by showing how each and every claim recitation is described in the cited reference. The Examiner has failed to meet this burden and the rejection should be reversed.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

For the Board's convenience, a comparison of claim 14 and the cited portions follows:

Claim 14 recites: receiving an access request;

The final office action cites col. 1, lines 29-32 of Nizar:

> In brief, one embodiment of the invention relates to an apparatus comprising a device and a controller coupled to the device. The controller controls access to the device by throttling access requests to the device.

Applicants note that the cited portion does not describe receiving an access request.

Claim 14 recites: calculating the temperature estimate in accordance with the access request;

The final office action first cites col. 2, lines 1-14 of Nizar:

> In one embodiment, the present invention relates to a method and apparatus for monitoring and controlling memory access rate between a core logic and memory components such that power dissipation and therefore thermal specification of the core logic is met. Herein, "core logic" includes a memory controller. "Memory components" include non-volatile and volatile memory such as synchronous dynamic random access memory (SDRAM). "Thermal specification" designates a particular component's

tolerance for heat. For example, given a component, its thermal
specification describes the approximate temperature at which the
component is likely to slow down and/or cause system failures or
to break down.

The final office action further cites col. 12, lines 3-28 of Nizar:

> More specifically, for a given amount of I/O traffic each
> I/O interface dissipates a different amount of power depending
> frequency, voltage swing and load impedance. The I/O power
> dissipated by each I/O interface can be calculated based on the
> interface characteristics and the amount of I/O traffic being driven
> out from the interface.
> Given that analysis indicates that for a given unit of I/O
> traffic interface B 702 dissipates twice as much power as interface
> A 700, and interface C 704 dissipates 3 times as much power as
> interface A 700, the illustrated embodiment processes data access
> between a data source 708 and the I/O interfaces by weighting the
> respective I/O interfaces. For example, based on calculations it
> may be determined that when 300 MB/s of traffic is driven on
> interface C 704 the package and die thermal limits are reached.
> Note however that interface A 700 dissipates 1/3 the power per I/O
> unit as compared to interface C 704. This means that 900 MB/s of
> traffic could be driven out of interface C 704 before the package
> thermal limit is reached. With a counter that weights all interface
> traffic the same, the throttle counter limit would still need to be set
> to 300 MB/s to keep the package temperature within its limit in the
> event that all 300 MB/s are routed to interface C 704. Throttling
> would also go into effect when 300 MB/s of traffic occurs on
> interface A 700 even though 900 MB/s could have been allowed.
> This means that 600 MB/s of traffic on interface A 700 is given up
> due to the fact that all traffic is counted the same.

Applicants note that neither of the cited portions even mentions the words 'access
request' and they both further fail to describe any calculation of a temperature estimate.

Claim 14 recites: determining if the temperature estimate exceeds a temperature

                       threshold; and

                       imposing an access request budget if the temperature estimate

                       exceeds the temperature threshold.

The final office action cites col. 5, lines 50-63 of Nizar:

> The throttle regime 301b specifies the throttling time. The throttling time may be an integer multiple of a given sampling window. In one embodiment, each throttling time is in the order of seconds and is further divided into throttling windows which are in the order of microseconds (for example ten microseconds). For each throttling window, there is a maximum quad-word (QW) value provided which designates the number of accesses that may be performed. More access requests to system memory are blocked by the DRAM arbiter for the remaining duration of the throttling window. The ratio of access budget to throttling windows effectively controls the access rate to guarantee that the die temperature of the core logic components remains controlled.

The final office action further cites col. 3, lines 4-25 of Nizar:

> FIG. 1b is a state diagram illustrating one embodiment of throttling logic 114 of FIG. 1a. The throttling logic remains at a monitor state 125 while the number of processed access requests from a source to a destination are being monitored. If the number of processed access requests is equal to or greater than a predetermined threshold 126, the throttling logic transitions to a throttle state 127. In an alternative embodiment, if the throttling logic monitors the temperature of the device and determines that the device is approaching and/or is outside its thermal specification, or if the throttling logic receives an indication to that effect, then it transitions to throttle state 127.
>
> In throttle state 127, the throttle logic throttles access requests from the source to the destination until a pre-determined time period has elapsed or in the alternative, a pre-determined number of access requests has been masked as represented by state transition 128. In an alternative embodiment, a pre-determined number of access requests are masked until the temperature reaches a desired level. The state then transitions back to a monitor state 125 and the cycle may be repeated.

Applicants note that neither of the cited portions even mentions a temperature estimate or comparing a temperature estimate to a temperature threshold. Nothing in the two cited portions described the conditions under which the access budget is imposed. The only mention of an access budget is in connection with a "ratio of access budget to throttling windows," which has nothing to do with temperature, estimated or otherwise. Applicants

further note the only description of device temperature is related to an actual monitored temperature, not a calculated temperature estimate.

Because the Examiner has failed to set forth sufficient facts and analysis to establish anticipation, and because, as set forth above, the cited portions do not identically describe the claim recitations, claims 2, 14, and 26 are separately patentable over Nizar, and the rejection should be reversed. Claims 3-7 depend from claim 2 and are likewise patentable. Claims 15-19 depend from claim 14 and are likewise patentable. Claims 27-31 depend from claim 26 and are likewise patentable.

Claims 3, 15, and 27

Claims 3, 15, and 27 each recite features relating to processing the access request without an access request budget if the temperature estimate does not exceed the temperature threshold. The final office action fails to establish anticipation of these claims.

With respect to claims 3, 15, and 27, the office action cites various portions or figures of Nizar, for allegedly disclosing these claims, without any supporting analysis or statements as to how the cited portions or figures might read on the claims. Even with reference to the cited portions, it is not apparent to applicants how the Examiner might be applying the reference against the claims.

The applicants respectfully requested a new, non-final office action in compliance with 37 C.F.R. § 1.104(c)(2), setting forth the Examiner's position with particularity as to how the cited portions of Nizar allegedly reads on each and every claim recitation of these dependent claims. Such clarification was not provided. In the absence of the Examiner setting forth sufficient analysis to establish anticipation, claims 3, 15, and 27 are not anticipated by and are separately patentable over Nizar, and the rejection should be reversed.

Without a clearly articulated basis of the rejection, which clearly explains the pertinence of the cited portion and properly communicates the basis for the rejection, applicants have been deprived of a fair opportunity to reply. In any event, the Examiner has the burden in the first instance to establish anticipation by showing how each and every claim recitation is described in the cited reference. The Examiner has failed to meet this burden and the rejection should be reversed.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

To save paper, applicants have not reproduced the cited portions, and the exercise of reviewing the cited portions for how they might read on the clams is left to the Board. Applicants submit that the Examiner's position cannot be readily ascertained. Applicants note that the cited portions do not describe or even mention the access request budget or any conditions under which such budget is not imposed. It appears that both cited portions describe 'throttling' activity which would indicate that the accesses are being controlled against some budget (even if being 'throttled' up). The cited portions further do not describe or even mention any temperature estimate.

Because the Examiner has failed to set forth sufficient facts and analysis to establish anticipation, and because the cited portions do not identically describe the claim recitations, claims 3, 15, and 27 are separately patentable over Nizar, and the rejection should be reversed.

Claims 4, 16, and 28

Claims 4, 16, and 28 each recite features relating to processing the request in accordance with the imposed access request budget if the temperature estimate exceeds

the temperature threshold. The final office action fails to establish anticipation of these claims.

With respect to claims 4, 16, and 28, the office action cites various portions or figures of Nizar, for allegedly disclosing these claims, without any supporting analysis or statements as to how the cited portions or figures might read on the claims. Even with reference to the cited portions, it is not apparent to applicants how the Examiner might be applying the reference against the claims.

The applicants respectfully requested a new, non-final office action in compliance with 37 C.F.R. § 1.104(c)(2), setting forth the Examiner's position with particularity as to how the cited portions of Nizar allegedly reads on each and every claim recitation of these dependent claims. Such clarification was not provided. In the absence of the Examiner setting forth sufficient analysis to establish anticipation, claims 4, 16, and 28 are not anticipated by and are separately patentable over Nizar, and the rejection should be reversed.

Without a clearly articulated basis of the rejection, which clearly explains the pertinence of the cited portion and properly communicates the basis for the rejection, applicants have been deprived of a fair opportunity to reply. In any event, the Examiner has the burden in the first instance to establish anticipation by showing how each and every claim recitation is described in the cited reference. The Examiner has failed to meet this burden and the rejection should be reversed.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

To save paper, applicants have not reproduced the cited portions, and the exercise of reviewing the cited portions for how they might read on the clams is left to the Board.

Applicants submit that the Examiner's position cannot be readily ascertained. Applicants note that the cited portions do not describe or even mention the access request budget or any conditions under which such budget is imposed. The cited portions further do not describe or even mention any temperature estimate.

Because the Examiner has failed to set forth sufficient facts and analysis to establish anticipation, and because the cited portions do not identically describe the claim recitations, claims 4, 16, and 28 are separately patentable over Nizar, and the rejection should be reversed.

Claims 5, 17, and 29

Claims 5, 17, and 29 each recite features relating to calculating a new access request budget each time the access request budget is imposed. The final office action fails to establish anticipation of these claims.

With respect to claims 5, 17, and 29, the office action cites various portions or figures of Nizar, for allegedly disclosing these claims, without any supporting analysis or statements as to how the cited portions or figures might read on the claims. Even with reference to the cited portions, it is not apparent to applicants how the Examiner might be applying the reference against the claims.

The applicants respectfully requested a new, non-final office action in compliance with 37 C.F.R. § 1.104(c)(2), setting forth the Examiner's position with particularity as to how the cited portions of Nizar allegedly reads on each and every claim recitation of these dependent claims. Such clarification was not provided. In the absence of the Examiner setting forth sufficient analysis to establish anticipation, claims 5, 17, and 29 are not anticipated by and are separately patentable over Nizar, and the rejection should be reversed.

Without a clearly articulated basis of the rejection, which clearly explains the pertinence of the cited portion and properly communicates the basis for the rejection, applicants have been deprived of a fair opportunity to reply. In any event, the Examiner has the burden in the first instance to establish anticipation by showing how each and every claim recitation is described in the cited reference. The Examiner has failed to meet this burden and the rejection should be reversed.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

The cited portion of col. 8, lines 63-65, follows: "Finally, for each and every read throttling monitoring window, the present invention allocates a budget of read maximum QW to be performed." The Examiner's position is unclear with respect to what is relied upon for the recited 'access request budget.' Presumably, the Examiner is relying in some way on the described 'budget of read maximum QW.' However, claim 17 depends from claim 14 and, allegedly, some element of the portion cited against claim 14 reads on the recited access request budget. Because the Examiner has failed to identify with any particularity precisely what portions are relied upon for which claim recitations, it is unclear precisely what the Examiner's position is.

In any event, the described 'throttling window' is different from the recited 'access request budget'. At most, the 'throttling window' is a very small slice of the access budget (see col. 5, lines 50-63). Moreover, the cited portion describes that the budget if read maximum QW is 'allocated,' which is different from the recited 'calculated.' Finally, the cited portion does not describe that such allocations are done each time an access budget is imposed, just once for each throttling window.

Because the Examiner has failed to set forth sufficient facts and analysis to establish anticipation, and because the cited portions do not identically describe the claim

recitations, claims 5, 17, and 29 are separately patentable over Nizar, and the rejection should be reversed.

Claims 6, 18, and 30

Claims 6, 18, and 30 each recite features relating to calculating a new access request budget periodically. The final office action fails to establish anticipation of these claims.

With respect to claims 6, 18, and 30, the office action cites various portions or figures of Nizar, for allegedly disclosing these claims, without any supporting analysis or statements as to how the cited portions or figures might read on the claims. Even with reference to the cited portions, it is not apparent to applicants how the Examiner might be applying the reference against the claims.

The applicants respectfully requested a new, non-final office action in compliance with 37 C.F.R. § 1.104(c)(2), setting forth the Examiner's position with particularity as to how the cited portions of Nizar allegedly reads on each and every claim recitation of these dependent claims. Such clarification was not provided. In the absence of the Examiner setting forth sufficient analysis to establish anticipation, claims 6, 18, and 30 are not anticipated by and are separately patentable over Nizar, and the rejection should be reversed.

Without a clearly articulated basis of the rejection, which clearly explains the pertinence of the cited portion and properly communicates the basis for the rejection, applicants have been deprived of a fair opportunity to reply. In any event, the Examiner has the burden in the first instance to establish anticipation by showing how each and every claim recitation is described in the cited reference. The Examiner has failed to meet this burden and the rejection should be reversed.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

The cited portion of col. 11, lines 60-61, follows: "The counter monitored the amount of I/O traffic being driven from the chip over a period of time." The cited portion of col. 3, lines 16-25 follows: "In throttle state 127, the throttle logic throttles access requests from the source to the destination until a pre-determined time period has elapsed or in the alternative, a pre-determined number of access requests has been masked as represented by state transition 128. In an alternative embodiment, a pre-determined number of access requests are masked until the temperature reaches a desired level. The state then transitions back to a monitor state 125 and the cycle may be repeated." Although the cited portions mention 'a period of time' and 'a pre-determined time period,' neither of these cite portions has any relevance to the claims. The various 'periods' described are simply not related to any calculation of a new access request budget.

Because the Examiner has failed to set forth sufficient facts and analysis to establish anticipation, and because the cited portions do not identically describe the claim recitations, claims 6, 18, and 30 are separately patentable over Nizar, and the rejection should be reversed.

Claims 7, 19, and 31

Claims 7, 19, and 31 each recite features relating to the new access request budget being calculated when a parameter involved in the calculation is updated. The final office action fails to establish anticipation of these claims.

With respect to claims 7, 19, and 31, the office action cites various portions or figures of Nizar, for allegedly disclosing these claims, without any supporting analysis or

statements as to how the cited portions or figures might read on the claims. Even with reference to the cited portions, it is not apparent to applicants how the Examiner might be applying the reference against the claims.

The applicants respectfully requested a new, non-final office action in compliance with 37 C.F.R. § 1.104(c)(2), setting forth the Examiner's position with particularity as to how the cited portions of Nizar allegedly reads on each and every claim recitation of these dependent claims. Such clarification was not provided. In the absence of the Examiner setting forth sufficient analysis to establish anticipation, claims 7, 19, and 31 are not anticipated by and are separately patentable over Nizar, and the rejection should be reversed.

Without a clearly articulated basis of the rejection, which clearly explains the pertinence of the cited portion and properly communicates the basis for the rejection, applicants have been deprived of a fair opportunity to reply. In any event, the Examiner has the burden in the first instance to establish anticipation by showing how each and every claim recitation is described in the cited reference. The Examiner has failed to meet this burden and the rejection should be reversed.

Although applicants submit that the Board should reverse the rejection for the substantive reasons set forth herein, at a minimum the Board should remand the case and require the Examiner to properly articulate the rejection of record, with the Examiner's complete analysis and reasoning.

The cited portion of col. 11, line 52 – col. 12, line 2 is reproduced above in connection with claims 1, 13, and 25. It is unclear as to what the Examiner's position with respect to the recited 'parameter' which is updated. Applicants are unable to identify any description in the cited portion which might correspond to an updated parameter. In any event, the cited portion is silent with respect to an access request budget or the calculation of a new access request budget.

Because the Examiner has failed to set forth sufficient facts and analysis to establish anticipation, and because the cited portion does not identically describe the claim recitations, claims 7, 19, and 31 are separately patentable over Nizar, and the rejection should be reversed.

CONCLUSION

In view of the foregoing, favorable reconsideration and reversal of the rejections is respectfully requested. Early notification of the same is earnestly solicited. If there are any questions regarding the present application, the Examiner and / or the Board is invited to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,

March 9, 2005   /Paul E. Steiner/
Date   Paul E. Steiner
                                           Reg. No. 41,326
                                           (703) 633 - 6830

Intel Americas
LF3
4030 Lafayette Center Drive
Chantilly, VA 20151

(viii) *Claims appendix.*

1.   An apparatus, comprising:

a device having a thermal characteristic which is dependent on a number of times the device is accessed over a period of time; and

a controller connected to the device and adapted to control access to the device,

wherein the controller is adapted to calculate a temperature estimate of the device and to control access to the device in accordance with the calculated temperature estimate.

2.   The apparatus of claim 1, wherein the controller is adapted to receive an access request, calculate the temperature estimate in accordance with the access request, determine if the temperature estimate exceeds a temperature threshold, and impose an access request budget if the temperature estimate exceeds the temperature threshold.

3.   The apparatus of claim 2, wherein the controller is adapted to process the access request without an access request budget if the temperature estimate does not exceed the temperature threshold.

4.   The apparatus of claim 2, wherein the controller is adapted to process the request in accordance with the imposed access request budget if the temperature estimate exceeds the temperature threshold.

5.   The apparatus of claim 2, wherein the controller is adapted to calculate a new access request budget each time the access request budget is imposed.

6.   The apparatus of claim 2, wherein the controller is adapted to calculate a new access request budget periodically.

7. The apparatus of claim 6, wherein the controller is adapted to calculate the new access request budget when a parameter involved in the calculation is updated.

8. The apparatus of claim 7, wherein the updated parameter corresponds to an ambient temperature.

9. The apparatus of claim 1, wherein the controller is adapted to calculate the temperature estimate in accordance with an estimated initial temperature of the device, an estimated equilibrium temperature of the device, and an estimated temperature decay rate for the device.

10. The apparatus of claim 9, wherein the controller is adapted to calculate the temperature estimate in accordance with the following equation:

$$T_n = T_{n-1} - \left[T_{n-1} - \left(T_a + P_{max} \cdot \theta_{ja} \cdot \frac{1/f_{request}}{\Delta_{update}} \cdot R_{count} \right) \right] \cdot \Delta_{update} \cdot \alpha \; ;$$

where: T_n corresponds to the temperature estimate;

T_{n-1} corresponds to a previous temperature estimate;

T_a corresponds to an ambient temperature;

P_{max} corresponds to a maximum device power;

θ_{ja} corresponds to a junction-to-ambient thermal resistance

$f_{request}$ corresponds to an access request frequency (e.g. a clock rate);

Δ_{update} corresponds to an estimator update period;

R_{count} corresponds to a number of access requests granted; and

α corresponds to a decay rate.

11.   The apparatus of claim 9, wherein the controller is adapted to calculate the temperature estimate in accordance with the following equation:

$$T_n = T_{n-1} - \left[T_{n-1} - \left(T_a + c_1 \cdot R_{count}\right)\right] \cdot c_2$$

where: T_n corresponds to the temperature estimate;

> T_{n-1} corresponds to a previous temperature estimate;
>
> T_a corresponds to an ambient temperature;
>
> R_{count} corresponds to a number of access requests granted;
>
> c_1 is a first constant; and
>
> c_2 is a second constant.

12.   The apparatus of claim 11, wherein c_1 corresponds to $(P_{max} * \theta_{ja} * 1/f_{request} / \Delta_{update})$ and c_2 corresponds to $(\Delta_{update} * \alpha)$;

where: P_{max} corresponds to a maximum device power;

> θ_{ja} corresponds to a junction-to-ambient thermal resistance
>
> $f_{request}$ corresponds to an access request frequency (e.g. a clock rate);
>
> Δ_{update} corresponds to an estimator update period;
>
> α corresponds to a decay rate.

13.   A method, comprising:

> providing a device having a thermal characteristic which is dependent on a number of times the device is accessed over a period of time;
>
> calculating a temperature estimate of the device; and
>
> controlling access to the device in accordance with the calculated temperature estimate.

14.   The method of claim 13, further comprising:

        receiving an access request;

        calculating the temperature estimate in accordance with the access request;

        determining if the temperature estimate exceeds a temperature threshold;

and

        imposing an access request budget if the temperature estimate exceeds the

temperature threshold.

15.   The method of claim 14, further comprising:

        processing the access request without an access request budget if the

temperature estimate does not exceed the temperature threshold.

16.   The method of claim 14, further comprising:

        processing the request in accordance with the imposed access request

budget if the temperature estimate exceeds the temperature threshold.

17.   The method of claim 14, further comprising:

        calculating a new access request budget each time the access request

budget is imposed.

18.   The method of claim 14, further comprising:

        calculating a new access request budget periodically.

19.   The method of claim 18, the new access request budget is calculated

when a parameter involved in the calculation is updated.

20.   The method of claim 19, wherein the updated parameter corresponds to an

ambient temperature.

21.   The method of claim 13, wherein the calculating comprises calculating the

temperature estimate in accordance with an estimated initial temperature of the device, an

estimated equilibrium temperature of the device, and an estimated temperature decay rate for the device.

22.   The method of claim 21, wherein the temperature estimate is calculated in accordance with the following equation:

$$T_n = T_{n-1} - \left[T_{n-1} - \left(T_a + P_{max} \cdot \theta_{ja} \cdot \frac{1/f_{request}}{\Delta_{update}} \cdot R_{count} \right) \right] \cdot \Delta_{update} \cdot \alpha \quad ;$$

where: T_n corresponds to the temperature estimate;

> T_{n-1} corresponds to a previous temperature estimate;
>
> T_a corresponds to an ambient temperature;
>
> P_{max} corresponds to a maximum device power;
>
> θ_{ja} corresponds to a junction-to-ambient thermal resistance
>
> $f_{request}$ corresponds to an access request frequency (e.g. a clock rate);
>
> Δ_{update} corresponds to an estimator update period;
>
> R_{count} corresponds to a number of access requests granted; and
>
> α corresponds to a decay rate.

23.   The method of claim 21, wherein the temperature estimate is calculated in accordance with the following equation:

$$T_n = T_{n-1} - \left[T_{n-1} - \left(T_a + c_1 \cdot R_{count} \right) \right] \cdot c_2$$

where: T_n corresponds to the temperature estimate;

> T_{n-1} corresponds to a previous temperature estimate;
>
> T_a corresponds to an ambient temperature;
>
> R_{count} corresponds to a number of access requests granted;
>
> c_1 is a first constant; and
>
> c_2 is a second constant.

24.   The method of claim 23, wherein c_1 corresponds to $(P_{max} * \theta_{ja} *$

$1/f_{request} / \Delta_{update})$ and c_2 corresponds to $(\Delta_{update} * \alpha)$;

where: P_{max} corresponds to a maximum device power;

θ_{ja} corresponds to a junction-to-ambient thermal resistance

$f_{request}$ corresponds to an access request frequency (e.g. a clock rate);

Δ_{update} corresponds to an estimator update period;

α corresponds to a decay rate.

25.   A system, comprising:

a processor;

a device; and

a controller connected between the processor and the device,

wherein the controller is adapted to calculate a temperature estimate of the

device and to control access to the device in accordance with the calculated temperature

estimate.

26.   The system of claim 25, wherein the controller is adapted to receive an

access request, calculate the temperature estimate in accordance with the access request,

determine if the temperature estimate exceeds a temperature threshold, and impose an

access request budget if the temperature estimate exceeds the temperature threshold.

27.   The system of claim 26, wherein the controller is adapted to process the

access request without an access request budget if the temperature estimate does not

exceed the temperature threshold.

28.   The system of claim 26, wherein the controller is adapted to process the

request in accordance with the imposed access request budget if the temperature estimate

exceeds the temperature threshold.

29.   The system of claim 26, wherein the controller is adapted to calculate a new access request budget each time the access request budget is imposed.

30.   The system of claim 26, wherein the controller is adapted to calculate a new access request budget periodically.

31.   The system of claim 30, wherein the controller is adapted to calculate the new access request budget when a parameter involved in the calculation is updated.

32.   The system of claim 31, wherein the updated parameter corresponds to an ambient temperature.

33.   The system of claim 25, wherein the controller is adapted to calculate the temperature estimate in accordance with an estimated initial temperature of the device, an estimated equilibrium temperature of the device, and an estimated temperature decay rate for the device.

34.   The system of claim 33, wherein the controller is adapted to calculate the temperature estimate in accordance with the following equation:

$$T_n = T_{n-1} - \left[T_{n-1} - \left(T_a + P_{max} \cdot \theta_{ja} \cdot \frac{1/f_{request}}{\Delta_{update}} \cdot R_{count} \right) \right] \cdot \Delta_{update} \cdot \alpha \quad ;$$

where: T_n corresponds to the temperature estimate;

T_{n-1} corresponds to a previous temperature estimate;

T_a corresponds to an ambient temperature;

P_{max} corresponds to a maximum device power;

θ_{ja} corresponds to a junction-to-ambient thermal resistance

$f_{request}$ corresponds to an access request frequency (e.g. a clock rate);

Δ_{update} corresponds to an estimator update period;

R_{count} corresponds to a number of access requests granted; and

α corresponds to a decay rate.

35.   The system of claim 33, wherein the controller is adapted to calculate the temperature estimate in accordance with the following equation:

$$T_n = T_{n-1} - \left[T_{n-1} - \left(T_a + c_1 \cdot R_{count} \right) \right] \cdot c_2$$

where: T_n corresponds to the temperature estimate;

        T_{n-1} corresponds to a previous temperature estimate;

        T_a corresponds to an ambient temperature;

        R_{count} corresponds to a number of access requests granted;

        c_1 is a first constant; and

        c_2 is a second constant.

36.   The system of claim 35, wherein c_1 corresponds to $(P_{max} * \theta_{ja} * 1/f_{request} / \Delta_{update})$ and c_2 corresponds to $(\Delta_{update} * \alpha)$;

where: P_{max} corresponds to a maximum device power;

        θ_{ja} corresponds to a junction-to-ambient thermal resistance

        $f_{request}$ corresponds to an access request frequency (e.g. a clock rate);

        Δ_{update} corresponds to an estimator update period;

        α corresponds to a decay rate.

(ix) *Evidence appendix.*

None.

(x) *Related proceedings appendix.*

None.

TRANSMITTAL FORM

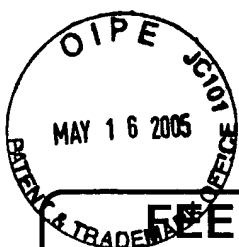*(to be used for all correspondence after initial filing)*

Application No.	10/606,514
Filing Date	June 25, 2003
First Named Inventor	David S. De Lorenzo
Art Unit	2125
Examiner Name	Sean P. Shechtman

Total Number of Pages in This Submission	33	Attorney Docket Number	42P15056

ENCLOSURES *(check all that apply)*

☒ Fee Transmittal Form

    ☒ Fee Attached

☐ Amendment / Response

    ☐ After Final
    ☐ Affidavits/declaration(s)

☐ Extension of Time Request

☐ Express Abandonment Request

☐ Information Disclosure Statement

    ☐ PTO/SB/08

☐ Certified Copy of Priority Document(s)

☐ Response to Missing Parts/ Incomplete Application

    ☐ Basic Filing Fee
    ☐ Declaration/POA
    ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53

☐ Drawing(s)

☐ Licensing-related Papers

☐ Petition

☐ Petition to Convert a Provisional Application

☐ Power of Attorney, Revocation Change of Correspondence Address

☐ Terminal Disclaimer

☐ Request for Refund

☐ CD, Number of CD(s)

☐ After Allowance Communication to Group

☐ Appeal Communication to Board of Appeals and Interferences

☒ Appeal Communication to Group (Appeal Notice, Brief, Reply Brief)

☐ Proprietary Information

☐ Status Letter

☒ Other Enclosure(s) *(please identify below):*

- Return Receipt Postcard
-Check for $500.00.

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm *or* Individual name	Mark C. Van Ness, Reg. No. 39,865 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	
Date	May 9, 2005

CERTIFICATE OF MAILING/TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Typed or printed name	**Gayle Bekish**		
Signature		Date	**May 9, 2005**

FEE TRANSMITTAL
for FY 2005
Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT ($)	500.00

Complete if Known

Application Number	10/606,514
Filing Date	June 25, 2003
First Named Inventor	David S. De Lorenzo
Examiner Name	Sean P. Shechtman
Art Unit	2125
Attorney Docket No.	42P15056

METHOD OF PAYMENT *(check all that apply)*

☒ Check   ☐ Credit card   ☐ Money Order   ☐ None   ☐ Other (please identify): _____

☐ Deposit Account   Deposit Account Number: 02-2666   Deposit Account Name: Blakely, Sokoloff, Taylor & Zafman LLP

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below

☒ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR §§ 1.16, 1.17, 1.18 and 1.20.

☐ Charge fee(s) indicated below, except for the filing fee

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FEE CALCULATION

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1251	120	2251	60	Extension for reply within first month	
1252	450	2252	225	Extension for reply within second month	
1253	1,020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1,080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	
1402	500	2402	250	Filing a brief in support of an appeal	500.00
1403	1,000	2403	500	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
1809	790	1809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	

Other fee (specify) _____

SUBTOTAL (2) ($)	500.00

SUBMITTED BY

Complete (if applicable)

Name (Print/Type)	Mark C. Van Ness	Registration No. (Attorney/Agent)	39,865	Telephone	(503) 439-8778
Signature	*(signature)*			Date	05/09/05